

VEROMESSOR LOBOGNATHUS: THIRD NOTE¹ **(Hymenoptera: Formicidae)**

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In previous publications we have reported (1956, 1959, 1963) the finding of seven nests of *Veromessor lobognathus* (Andrews) in a single locality in southwestern North Dakota. Four others had been reported from Colorado and Nevada (Gregg, 1955), making a total of eleven. Recently Cole (1963) has found 58 nests atop a single mesa in Nevada and concluded therefrom that this species is not rare. With that we disagree, for it still is known from only seven widely spaced localities.

Since the North Dakota locality is 450 miles north of the nearest Colorado locality, we suspected the species would occur somewhere in between. Accordingly we explored the Little Missouri Badlands south of Medora and hunted in the Cave Hills in northwestern South Dakota and in the Black Hills but without success. Finally last summer (1963) our efforts were rewarded: we found two nests in southwestern South Dakota.

SOUTH DAKOTA COLONIES

LOCALITY. Custer County, South Dakota, sec. 18, T. 3 S., R. 1 E. Elevation 4,750 feet. June 10, 1963. On an ordinary map this locality may be spotted 22 miles west of Custer and three fourths of a mile east of the Wyoming boundary.

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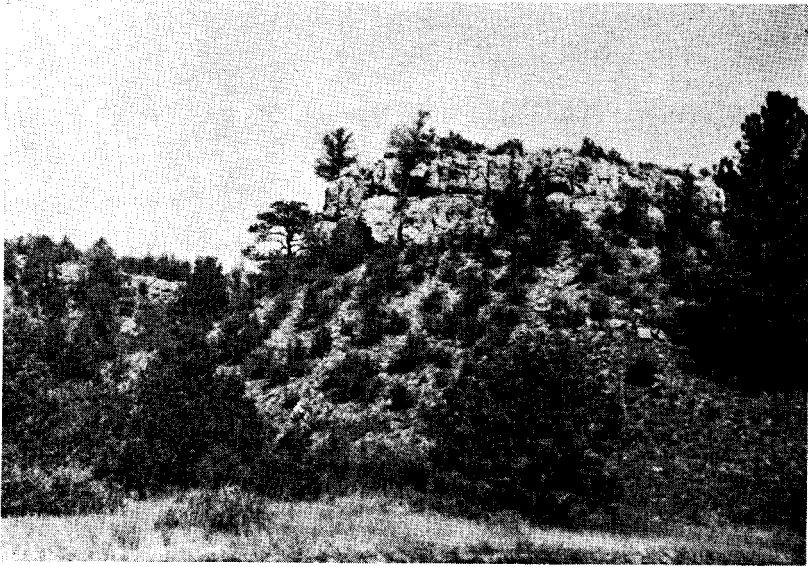


FIG. 1. Habitat of *Veromessor lobognathus* in South Dakota. The man (below and to left of center) is kneeling beside Nest No. SD201. The trees in the foreground and on the left are *Juniperus scopulorum*.

GEOLOGY. On the western flank of the Black Hills; on the eastern side of the Red Valley; on Paleozoic limestone, Minnelusa Formation (Pennsylvanian). The stony red soil was weathered from red silty limestone.

TOPOGRAPHY. The nests were on the north wall of a short narrow valley tributary to the wider valley of an unnamed south-flowing intermittent stream, which unites with a similar stream in Redbird Canyon.

HABITAT. The habitat (Fig. 1) is similar to the North Dakota habitats, which accounts for our discovering it: a steep treeless south-facing slope, with much of the soil surface bare, with the grasses in clumps and with scattered small shrubs. At the bottom of the narrow valley and on the adjacent north-facing slope there was a dense stand of *Juniperus scopulorum*. Three grasses were common to the habitats in both states: *Stipa comata* Trin. & Rupr., *Bouteloua gracilis* (HBK) Lag., and *Oryzopsis hymenoides* (R. & S.) Ricker. Also present in both were yucca (*Yucca glauca* Nutt.) and prickly pear (*Opuntia polycantha* Haw.). Mountain mahogany (*Cercocarpus montanus* Raf.), which was abundant in the South Dakota habitat, does not occur in North Dakota. The ill-scented sumac (*Rhus trilobata* Nutt.) and the sagebrush (*Artemisia* spp.) of the North Dakota habitats were lacking



FIG. 2. Nest site of *Veromessor lobognathus*. The stake is at the left of the crater. Scale is indicated by the card, which measures $3'' \times 5''$.

in the South Dakota habitat. The scorpion *Vejovis boreus* Girard occurred in both.

No nest of *Pogonomyrmex occidentalis* (Cresson) was found on the slope; the nearest was 75 yards from the *Veromessor* nests and on the flat floor of the main valley.

NESTS. Nest No. SD201 had two entrances: one was surrounded by a circular crater of freshly excavated earth three inches in diameter and one inch high, the other by a semicircle of the same material. See Fig. 2.

Nest No. SD204 was seven yards obliquely uphill from 201. It was under a half-buried stone $8'' \times 10'' \times 3''$, under a second stone $8'' \times 12'' \times 3''$, which was covered by the first stone, and under several smaller adjacent stones. There was no excavated earth about the entrances.

HARVESTING. Seeds of two species of grasses were found in one of the nests (SD204): *Stipa comata* and *Oryzopsis hymenoides*. Since the awn of *Stipa comata* may attain a length of six inches, it is obvious that the entire fruit cannot be taken into the nest. Workers in a captive

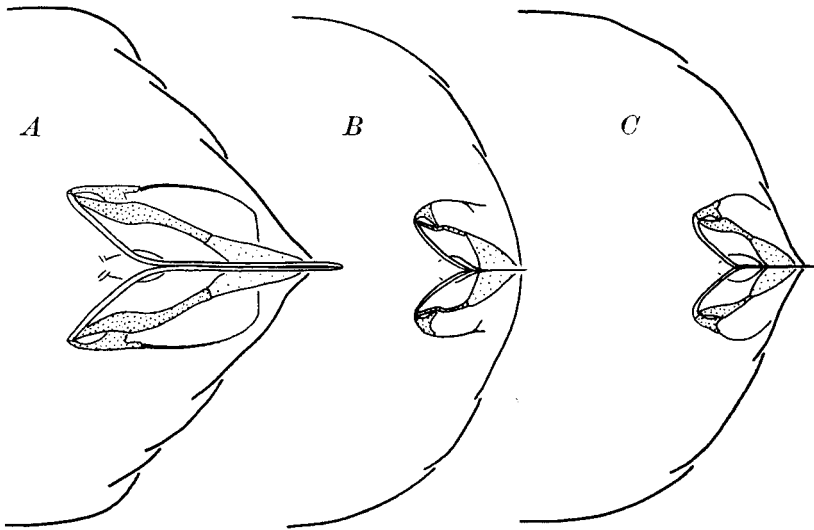


FIG. 3. Posterior ends of gasters in ventral view; from specimens cleaned in KOH solution; all drawn to the same width. A, *Pogonomyrmex occidentalis*, $\times 43$; B, *Veromessor lobognathus*, $\times 43$; C, *Veromessor andreii*, $\times 38$.

colony of *V. lobognathus* were observed gnawing off the awn and carrying away the seed. Fruits of the same grass were ignored by workers in a captive colony of *Pogonomyrmex occidentalis*.

NORTH DAKOTA COLONIES

Of the seven North Dakota colonies two were destroyed in the course of our studies. The other five were alive and flourishing when we inspected them in the summer of 1963. One has been under observation since 1958, the remaining four were discovered in 1960; all have survived severe drouths in two successive summers.

To the short list of seeds harvested we now add *Stipa viridula* Trin.

DEFENSE

We now regard this species as more aggressive than we reported earlier. When a nest is disturbed the workers attack promptly and bite readily with a tenacious grip. Two workers biting tender human skin *ad libitum* dropped off after 45 minutes. We have found the bite annoying but rarely painful. Workers biting cloth held on indefinitely; attempts to pull them off frequently detached the body, leaving the head still attached by the gripping mandibles.

The sting of *V. lobognathus* is vestigial (Fig. 3). Occasionally an attacking worker will perform the usual stinging motions, exerting the

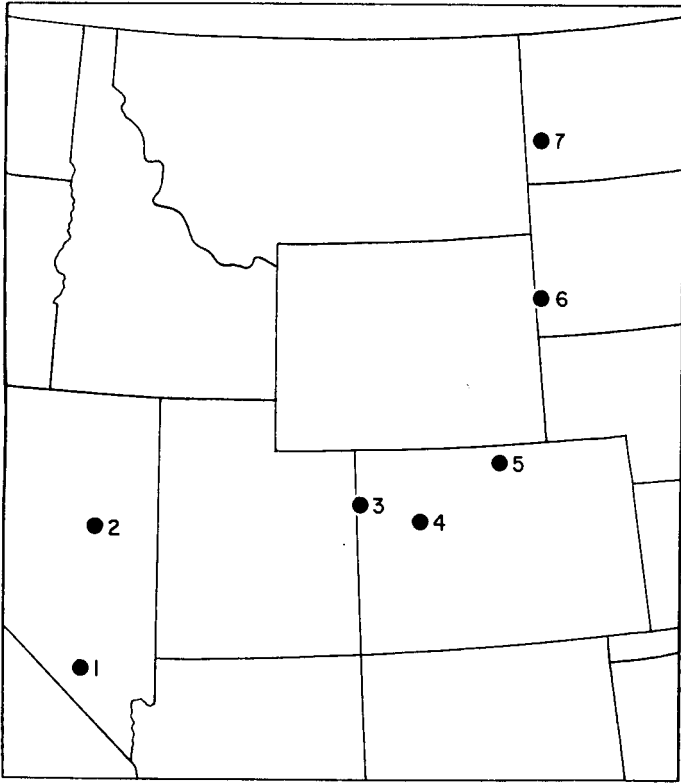


FIG. 4. The distribution of *Veromessor lobognathus*. 1, Mercury, Nevada, elevation 7,000'; 2, forty-five miles west of Ely, Nevada, elevation 6,900'; 3, twenty miles southwest of Rangely, Colorado, elevation 6,500'; 4, Glenwood Springs, Colorado, elevation of nest site unknown; 5, twenty miles northwest of Fort Collins, Colorado, elevation 6,100'; 6, twenty-two miles west of Custer, South Dakota, elevation 4,750'; 7, four miles north-northeast of Medora, North Dakota, elevation 2,500'.

vestige but not inserting it into human skin. We saw numerous workers attack a caterpillar with their mandibles, but no stinging motions were observed.

We have prepared the stings of *Pogonomyrmex occidentalis* and five species of *Veromessor*—*V. andrei* (Mayr), *V. chamberlini* (Wheeler), *V. lariversi* M. R. Smith, *V. lobognathus* and *V. pergandei* (Mayr)—by cleaning the gasters with a 10% solution of potassium hydroxide. All *Veromessor* stings are vestigial and developed to about the same degree (see Fig. 3B and C). In marked contrast to *Veromessor* the functional sting of *P. occidentalis* is well developed (Fig. 3A).

THE BIOME

The Pinyon-Juniper Climax "extends from northern Mexico along the west slope of the Rockies to the Snake River in Idaho, beyond which it continues into southern Alberta with piñon and desert junipers replaced by *Juniperus occidentalis* or *J. scopulorum*. Along the east slope, it extends to Fort Collins, Colorado, where piñon drops out. Northward through Wyoming it is represented by *J. scopulorum*, often with sagebrush in association. . . . The openings between trees support a grass cover (*Bouteloua*, *Stipa*, *Agropyron*, *Poa*) and numerous other herbs, together with a few shrubs (*Ceanothus*, *Cercocarpus*, *Purshia*, *Cowania*, *Artemisia*, *Opuntia*) characteristic of the next lower zone." (Oosting, 1956, p. 304). It is true that the Pinyon-Juniper Biome is not mapped into the Dakotas on maps showing the biomes of North America, but that is to be expected, because the areas are too small. But it has already been suggested that this biome does extend into southwestern North Dakota: "The juniper-slope type is believed to be a northeastward postclimax extension of the pinyon-juniper woodland from Wyoming and Montana" (Nelson, 1961, p. 43).

Is *Veromessor lobognathus* characteristic of the Pinyon-Juniper Biome? One Nevada habitat is "pinyon-juniper and sagebrush" and the other "sagebrush desert." One Colorado habitat is "pinyon-cedar woodland," while the other is "pinyon-cedar woodland with sagebrush." In the Dakotas this ant has been found nesting only on treeless south-facing slopes, but *Juniperus scopulorum* thickets on north-facing slopes have never been far away. It seems reasonable therefore to conclude that *Veromessor lobognathus* is a characteristic species of the Pinyon-Juniper Biome.

SUMMARY OF PRESENT KNOWLEDGE

1. *Veromessor lobognathus* is a rare ant: 69 nests have been reported, but 58 of these were from a single locality.
2. The range of the species is linear—a sigmoid curve 1,300 miles long, extending from southern Nevada to southwestern North Dakota.
3. The elevation (above mean sea level) of the collecting sites decreases progressively from 7,000 feet at the southwestern end of the range to 2,500 feet at the northeastern end.
4. *V. lobognathus* is a characteristic inhabitant of the Pinyon-Juniper Biome, a semi-arid environment.
5. In the Dakotas the nests have been found only on steep treeless south-facing slopes where much of the surface is bare. Characteristic plants of the habitats are grasses in clumps, low shrubs, yucca and prickly pear.
6. Nests (in the Dakotas) are of two types: (a) In sandy loam soil under large flat stones (North Dakota average = $36'' \times 18'' \times 3''$) which are only slightly buried; (b) when the soil contains numerous small stones, there is a small mound of excavated earth about the entrance.

7. The workers are aggressive and bite tenaciously. The sting is vestigial.

8. The seeds of three grasses are harvested (in the Dakotas): *Oryzopsis hymenoides*, *Stipa comata* and *S. viridula*.

9. *Veromessor lobognathus* seems to be a mimic of *Pogonomyrmex occidentalis*. (See Wheeler and Wheeler, 1959, p. 179.)

LITERATURE CITED

- Cole, A. C. 1963. A new species of *Veromessor* from the Nevada test site and notes on related species. *Ann. Entomol. Soc. Amer.* 56:678-682.
- Gregg, R. E. 1955. The rediscovery of *Veromessor lobognathus* (Andrews). *Psyche* 62:45-52.
- Nelson, J. R. 1961. Woody plant communities in the Badlands of western North Dakota. *Proc. North Dakota Acad. Sci.* 15:42-44.
- Oosting, H. J. 1956. The study of plant communities. W. H. Freeman and Co., San Francisco. 440 p.
- Wheeler, G. C., and Jeanette Wheeler. 1956. *Veromessor lobognathus* in North Dakota. *Psyche* 63:140-145.
- . 1959. *Veromessor lobognathus*: second note. *Ann. Entomol. Soc. Amer.* 52:176-179.
- . 1963. The ants of North Dakota. The University of North Dakota Press, Grand Forks. 326 p.



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